## In the Claims:

Listing of all claims:

A method of MIG welding (Original) 1. 1 comprising: 2 providing ac power to a weld, wherein the ac power 3 has a negative portion and a positive portion, and the ac power further has a frequency; 5 wherein the negative portion is greater than the 6 7 positive portion; wherein the frequency is at least 60 Hz. 8 The method of claim 1, wherein the 1 2. (Original) 2 frequency is between 90 Hz and 120 Hz. The method of claim 1, further 3. (Original) 1 including providing a consumable, flux-cored, wire to the weld. 2 (Original) The method of claim 1, further 4. 1 including providing a consumable, metal-cored, wire to the weld. 2 (Original) The method of Claim 4, wherein 1 providing the wire includes providing a wire wherein the wire 2 comprises a sheath encapsulating a core having a core 3 composition, the core composition comprising a combination of 4 graphite and one or more compounds of potassium, the combination 5 of graphite and compounds of potassium in the core composition 6 not exceeding approximately 5% by weight. 7 . The method of Claim 5, wherein 1 (Original) providing the wire includes providing the wire electrode wherein 2 the one or more compounds of potassium comprise K2MnTiO4. 3

- 7. (Currently Amended) The method of Claim 6, wherein providing the includes providing the wire wherein the combination is selected from the range from about 0.3% to about 5.0% by weight.
- 1 8. (Original) The method of claim 1, further
  2 comprising providing a weld path on at least one workpiece,
  3 wherein the weld path includes a groove having an angle of less
  4 than 50 degrees.
- 9. (Original) The method of claim 1, further comprising providing a weld path on at least one workpiece, wherein the weld path includes a groove having an angle of less than 30 degrees.
- 1 10. (Original) The method of claim 1, further 2 comprising providing a weld path on at least one workpiece, 3 wherein the weld path includes a groove having an angle of 4 between 20 degrees and 30 degrees.
- 1 11. (Original) The method of claim 1, including welding at a rate of at least 35 pounds per hour using a single arc.
- 1 12. (Original) The method of claim 11 including welding at a rate of at least 40 pounds per hour.
- 1 13. (Original) The method of claim 11 wherein the negative portion is at least twice the positive portion.
- 1 14. (Original) The method of claim 10 wherein the 2 negative portion is at least 1.5 times the positive portion.

Τ.	13. (Original) The meeting of crafting wherein the
2	weld process begins with a first negative portion having a
3 .	duration of at least 0.5 seconds.
1	16. (Original) The method of claim 14 wherein the
2	weld process begins with a first negative portion having a
3	duration of at least 0.75 seconds.
1	17. (Original) The method of claim 1 further
2	including providing a stick-out of about 2 inches.
1.	18. (Original) The method of claim 17 further
2	comprising providing a shielding gas at a rate of at least 80
3	cubic feet per hour.
1	19. (Original) A method of MIG welding
2	comprising:
3	providing ac power to a weld, wherein the ac power
4	has a negative portion and a positive portion, and the ac
5	power further has a frequency; and
6	providing at least one workpiece with a weld path
7	thereon, wherein the weld path includes a groove having an
8	angle of less than 50 degrees.
1	20. (Original) The method of claim 19, wherein
2	providing at least one workpiece includes providing the weld path
3	with the groove having the angle between 20 degrees and 30
4	degrees.
1	21. (Original) The method of claim 19, wherein
2	providing at least one workpiece includes providing the weld path
3	with the groove having the angle less than 30 degrees.

- The method of Claim 21, further 1 22. (Original) 2 comprising providing a wire comprising a sheath encapsulating a core having a core composition, the core composition comprising a 3 combination of graphite and one or more compounds of potassium, 4 5 the combination of graphite and compounds of potassium in the core composition not exceeding approximately 5% by weight. 6
- 1 23. (Original) The method of Claim 22, wherein 2 providing the wire includes providing the wire electrode wherein the one or more compounds of potassium comprise K2MnTiO4, and the 3 combination is selected from the range from about 0.3% to about 4 5 5.0% by weight.
- The method of claim 21 wherein: 1 24. (Original) 2 the negative portion is greater than the positive 3 portion; and the negative portion is at least 1.5 times the positive 4 5 portion.
- 1 25. (Original) The method of claim 24, wherein the 2 frequency is between 90 Hz and 120 Hz.
- 26. (Original) 1 The method of claim 24, further including providing a consumable, metal-cored, wire to the weld.

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- 27. (Original) The method of Claim 24, further comprising providing a wire comprising a sheath encapsulating a core having a core composition, the core composition comprising a combination of graphite and one or more compounds of potassium, the combination of graphite and compounds of potassium in the core composition not exceeding approximately 5% by weight.
- 1 28. (Original) The method of Claim 27, wherein providing the wire includes providing the wire electrode wherein 2 .

3	the one or more compounds of potassium comprise $\mathrm{K_2MnTiO_4}$ , and the
4	combination is selected from the range from about 0.3% to about
5	5.0% by weight.
1	29. (Original) A method of MIG welding
2	comprising:
3	providing ac power to a weld having a negative
4	portion and a positive portion, and the ac power further
5	having a frequency; and
6	providing a consumable, cored, wire to the weld.
1	30. (Original) The method of claim 29 wherein the
2	weld process begins with a first negative portion having a
3	duration of at least 0.5 seconds.
1	31. (Original) The method of claim 29 wherein the
2	weld process begins with a first negative portion having a
3	duration of at least 0.75 seconds.
	32-38. (Original) (Cancelled.)
1	39. (Original) A method of MIG welding
2	comprising:
3	providing ac power to a weld having a negative
4	portion and a positive portion, and the ac power further
5	having a frequency; and
6	wherein the negative portion is at least 1.5 times
7	the positive portion.
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1	40. (Original) The method of claim 39 wherein the
2	duration of the negative portion is at least 1.5 times the

duration of the positive portion.

1	41. (Original) The method of claim 39 wherein the
2	weld process begins with a first negative portion having a
3	duration of at least 0.5 seconds.
4	42. (Original) The method of claim 39 wherein the
5	weld process begins with a first negative portion having a
6	duration of at least 0.75 seconds.
1	43. (Original) A method of MIG welding
2	comprising:
3	providing ac power to a weld, wherein the ac power
4	has a negative portion and a positive portion, and the ac
5	power further has a frequency;
6	wherein the negative portion is greater than the
7	positive portion; and
8.	wherein the weld process begins with the negative
9	portion of at least 0.5 seconds duration.
1	44. (Original) The method of claim 43 wherein the
2	weld process begins with a first negative portion having a
3	duration of at least 0.75 seconds.
	45. (Cancelled.)
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1	46. (Original) A method of MIG welding
2	comprising:
3	providing ac power to a weld, wherein the ac power
4	has a negative portion and a positive portion, and the ac
5	power further has a frequency;
6	wherein the negative portion has a negative amp-
7	seconds and the positive portion has a positive amp-seconds,
8 .	and further wherein the magnitude of the negative amp-

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seconds; and

seconds is greater than the magnitude of the positive amp-

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- 1 47. (Original) The method of Claim 46, further
  2 comprising providing a wire comprising a sheath encapsulating a
  3 core having a core composition, the core composition comprising a
  4 combination of graphite and one or more compounds of potassium,
  5 the combination of graphite and compounds of potassium in the
  6 core composition not exceeding approximately 5% by weight.
- 1 48. (Original) The method of Claim 47, wherein 2 providing the wire includes providing the wire electrode wherein 3 the one or more compounds of potassium comprise K<sub>2</sub>MnTiO<sub>4</sub>, and the 4 combination is selected from the range from about 0.3% to about 5 5.0% by weight.
  - 49. (Original) A MIG welding system comprising:

power means for providing ac power to a weld,
wherein the ac power has a negative portion and a positive
portion, and the ac power further has a frequency; and
control means for controlling the power means,
wherein the negative portion has a negative amp-seconds and
the positive portion has a positive amp-seconds, wherein the
control means causes the negative amp-seconds to be greater
than the positive amp-seconds, and wherein the frequency is
at least 60 Hz.

- 50. (Original) The system of claim 49, wherein the control means includes means for providing the frequency to be between 90 Hz and 120 Hz.
- 1 51. (Original) The system of claim 49, further 2 including a consumable, flux-cored, wire, disposed to be provided 3 to the weld.

- 1 52. (Original) The system of claim 51, wherein the wire is metal-cored.
- 1 53. (Original) The system of claim 52, further 2 comprising a weld path on at least one work piece, wherein the 3 weld path includes a groove having an angle of less than 50 4 degrees.
- 1 54. (Original) The system of claim 49, further 2 comprising a weld path on at least one workpiece, wherein the 3 weld path includes a groove having an angle of less than 30 4 degrees.
- 1 55. (Original) The system of claim 54 wherein the control means for includes means for causing the negative ampseconds to be at least twice the positive ampseconds.
- 1 56. (Original) The system of claim 49 wherein the 2 control means includes means for causing the negative amp-seconds 3 to be at least 1.5 times the positive amp-seconds.
- 1 57. (Original) The system of claim 56 wherein the control means includes means for causing the weld process to begin with a first negative portion having a duration of at least 0.5 seconds.
- 1 58. (Original) The system of claim 49 wherein the control means includes means for causing the weld process to begin with a first cycle portion having a duration of at least 0.75 seconds.
- 1 59. (Original) A system of MIG welding arc comprising:

3	power means for providing to a weld ac power
4	having a negative portion and a positive portion, and the ac
5	power further having a frequency; and
6	means for providing a consumable, cored, wire to
7	the weld.
1	60. (Original) The system of claim 59 wherein the
2	power means includes means for beginning the weld process with a
3	first negative portion having a duration of at least 0.5 seconds.
1	61. (Original) A system of MIG welding
2	comprising:
3	power means for providing ac power to a weld, the
4	ac power having a negative portion and a positive portion,
5	and the ac power further having a frequency; and
6 .	means for controlling the power means such that
7	the negative portion is at least 1.5 times the positive
8	portion.
9	62. (Original) The system of claim 59 further
10	comprising means for controlling the power means such that the
11	weld process begins with a first negative portion having a
12	duration of at least 0.5 seconds.
•	$\cdot$ .
. 1	63. (Original) A system of MIG welding
2	comprising:
3	power means for providing ac power to a weld,
4	wherein the ac power has a negative portion and a positive
5	portion, and further has a frequency;
6	control means for controlling the power means such
7	that the negative portion is greater than the positive

the negative portion for at least 0.5 seconds.

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portion, and further such that the weld process begins with

(Original) A system of MIG welding 1 64. 2 comprising: power means for providing ac power to a weld, 3 wherein the ac power has a negative portion and a positive 4 5 portion, and further has a frequency; control means for controlling the power means such 6 7 that the negative portion has a negative amp-seconds and the positive portion has a positive amp-seconds, and further 8 wherein the magnitude of the negative amp-seconds is greater 9 10 than the magnitude of the positive amp-seconds. (Original) A system of MIG welding 1 2 comprising: 3 an ac power source having a MIG output with a 4 positive portion and a negative portion; a controller controllably connected to the power 5 6. source; 7 a feedback circuit disposed electrically between 8 the power source and the controller; 9 a source of consumable wire, disposed to provide wire to the MIG output; 10 wherein the controller provides that the negative 11 12 portion is greater than the positive portion, and further 13 wherein the MIG output has a frequency of at least 60 Hz. 1 (Original) The system of claim 65, wherein the 66. 2 power source is a step-up cycloconverter and the frequency is 3 between 90 Hz and 120 Hz. 1 67. (Original) The system of claim 65, wherein the 2 wire is a flux-cored wire.

wire comprises a sheath encapsulating a core having a core

The system of claim 65, wherein the

68. (Original)

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- 3 composition, the core composition comprising a combination of
- 4 graphite and one or more compounds of potassium, the combination
- of graphite and compounds of potassium in the core composition
- 6 not exceeding approximately 5% by weight.
- 1 69. (Original) The system of Claim 68, the one or
- 2 more compounds of potassium comprise K2MnTiO4.
- 1 70. (Original) The system of Claim 69, wherein the
- 2 combination is selected from the range from about 0.3% to about
- 3 5.0% by weight.
- 1 71. (Original) The system of claim 67, further
- 2 comprising providing a weld path on at least one work piece,
- 3 wherein the weld path includes a groove having an angle of less
- 4 than 50 degrees.
- 1 72. (Original) The system of claim 67, further
- 2 comprising providing a weld path on at least one work piece,
- 3 wherein the weld path includes a groove having an angle of less
- 4 than 30 degrees.
- 1 73. (Original) The system of claim 67 wherein the
- 2 negative portion is at least 1.5 times the positive portion.
- 1 74. (Original) The system of claim 67 wherein the
- 2 controller includes a start circuit, a control output and a
- 3 timing circuit, that provides a negative portion having a
- 4 duration of at least 0.5 seconds at the start of the weld
- 5 process.
- 75-78. (Original) (Cancelled.)

1	79. (Original) A system of MIG welding
<b>2</b>	comprising:
3 .	an ac power source having a control input and a
4	MIG output, wherein the MIG output has a negative portion
5 :	and a positive portion;
6	a controller, including a balance circuit and a
7	feedback circuit, operatively connected to the control input
8	such that the negative portion is at least 1.5 times the
9	positive portion.
1	80. (Original) A method of controlling
2	dilution in MIG welding comprising:
3	providing ac power to a weld, wherein the ac power
4	has a negative portion and a positive portion, and the ac
5	power further has a frequency;
6	controlling the balance of the negative portion
7	and the positive portion to obtain a desired dilution.
1	81. (Original) The method of claim 80 wherein the
2	negative portion is greater than the positive portion.

negative portion is less than the positive portion.

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82. (Original) The method of claim 80 wherein the